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DEVELOPMENT OF SOVIET TEXTILE-MACHINE-BUILDING INDUSTRY

HISTORY OF TEXTILE MACHINE BUILDING

Tekstil'naya Promyshlennost'
Leningrad, Nov 47

The first Russian textile mill, built in Moscow in 1808, was equipped with domestic machines. However, the tendency toward domestic production of textile machinery was not upheld by the Tsarist government. At the beginning of the second half of the 19th century, the duty on British spinning machines was removed and equipment of this type was imported.

Cotton spinning in Russia developed rapidly, but the embryo of domestic textile machine building had been destroyed. In 1881, the duty-free importation of textile machines was curtailed, and attempts to master the production of domestic equipment reappeared. In 1883, the Klimovsk Plant of the Moscow Metal Association went into operation. Beginning with the production of winding machines, tubing, coil winding, cord braiding, reed making, and warp machines, the plant mastered the production of power looms for the cotton industry. The production of looms was also organized at a plant of the Ivanovo-Vosnesensk /now Ivanovo/ Metal Association and at the Dobrova-Nabgol'ts Plant in Moscow. The production of power looms in Russia was thus firmly established.

However, attempts to perfect spinning machines had an unfortunate ending. A small group of flax-spinning machines produced by the Klimovsk Plant did not find application in industry. Dyeing and finishing machines of simple design were produced by the Ustritsev and Ivanovo Plants in Moscow and a plant of the Ivanovo-Vosnesensk Metal Association.

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In 1917, having brought their military work to a close, all plants noted above continued to work on their specialties, filling casual orders. At the same time, the textile industry found itself with shattered equipment after the war and, wherever possible, began distributing orders for machines but in a disorganized manner. Thus, the largest and best-qualified plants were attracted to textile machine building. In Leningrad, the Krasnyy putilovets Plant became occupied with the production of complex dyeing and finishing machines; the Plant imeni Karl Marx with the manufacture of spare parts for spinning machines, and the Krasnyy arsenal Plant and the Tula Armaments Plant with satisfying the needs of textile workers.

The first step in organizing textile machine building in the Soviet Union took place in 1925, at which time all textile machine building was concentrated in the Metal Syndicate. The Central Design Bureau of Textile Machine Building was organized and attached to the Metal Syndicate. The first model designed by the bureau was the BK carding machine for the cotton industry, which is still in use. The bureau has also designed the Type N automatic loom.

In 1927, the Texstil'mashina Joint-Stock Company was organized to coordinate and distribute orders among plants engaged in textile machine building. A so-called Standards Commission served as a technical staff whose task it was to select types of machines to be perfected. It consisted of qualified specialists and textile workers on the one hand and machine builders on the other. It was the duty of the commission to work out and approve standards, as well as to recommend types of machines to be perfected at Soviet plants. The commission attended lectures, discussed them, and, on the basis of decisions made after the discussions, sometimes voting, selected one or another type of equipment. In view of the growth of textile-machine building, such methods became inadequate. For this reason, in 1933, standards commissions curtailed their work, and problems concerning the selection of types of machines became the responsibility of the Central Design Bureau of Textile Machine Building. A scientific-research base was created and attached to the bureau. Discussions and voting were superseded by testing and research on the best types of existing machines before planning new ones. In 1929, when extensive development of the textile industry was planned and when the construction of giant textile enterprises began, an affiliate of the Central Design Bureau of Textile Machine Building was organized in Leningrad. Under the technical leadership of N. M. Dmitriyev and S. A. Parumonov, designers of spinning frames, fly frames and spinning frames for all fibers, as well as a number of other machines, were developed by the new affiliate.

Combines were once more under construction, and Soviet machines began to crowd out imported equipment. Whole shops equipped with Soviet-produced machines appeared at the Ivanovo Melange Kurovskoye, Barnaul, and Tashkent combines, the Mill imeni Lakin, the Mill imeni Dzerzhinskiy, the Krasnaya Talka Mill, etc.

More and more plants were drawn into textile machine building. At the same time, the organizational structure of control of this branch of industry changed. The Textil'mashina Joint-Stock Company was transformed into a trust and later into the Main Administration of Textile and Light Machine Building. Later, the light-machine-building enterprises were united into an independent administration. The Glavtekstilmash (Main Administration of Textile Machine Building) was formed within the system of the People's Commissariat of General Machine Building USSR.

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The plants which came under its jurisdiction included the Plant imeni Karl Marx, the Klimovsk Plant, the Presnenskiy Machine Building Plant, and the Ivanovo Dyeing and Finishing Machines Plant, a group of Orel plants, the Shuyskiy Plant imeni Frunze, the Lentekstil'mash Plant, the Plant imeni 1 Avgust and the Plant and imeni Artem.

The cotton industry began to receive complete equipment for entire mills from Soviet plants. Textile-machine-building plants perfected advanced techniques to be used in breaking and picking divisions, preparatory shops, and spinning, weaving, and dyeing and finishing plants. Basic machines for the wool industry were set up. Wool washers became completely satisfied with Soviet equipment. Carding and combing machines, intersecting, twisting, slubbing, winding, and warp machines, automatic looms, and a whole group of complex dyeing and finishing machines were perfected.

The requirements of the linen industry were satisfied in preparatory methods, as well as in the production of carding machines, spinning frames for dry and wet twisting, equipment for weaving divisions, bleaching establishments, and dyeing and finishing plants.

Bobbin-spinning and centrifugal-spinning frames, and pumps for them, were produced for synthetic-fiber mills.

The need for importing textile equipment had disappeared, and Soviet textile machine building became established on a sturdy footing.

However, the war put a stop to the development of textile machine building until 1943, when preparation for postwar development of the industry began. In 1945, the first postwar twist frame for cord was produced at the Plant imeni Karl Marx.

After the war, the distribution and appearance of plants were changed abruptly. A group of new, large enterprises appeared in Uzbekistan and in Penza Oblast; the Moscow and Ivanovo groups of plants went /back/ into operation; the Leningrad and southern groups, which had particularly suffered from enemy invasion, began to be reactivated.

The plants began to increase their capacity rapidly. Along with the series production of machines, they are successfully perfecting new techniques. Models of large-package, one-process picking and carding machines, released for the 30th anniversary of the October Revolution, are being tested at mills. The large packages are permitting a 20-30 percent increase in output and an improvement in the quality of products in the picking and carding divisions.

High-draft drawing frames with a five-roller drafting device, waste-lapping machines (pererabatyvayushiye kholstiki), and lapping machines without draft have been perfected. With the introduction of this equipment, the floor space required by one apparatus for 20 deliveries has been cut in half and the number of workers reduced 1.5 times.

Series production of high-draft can roving frames has been mastered. In the output of yarn of a wide variety of types, they permit the use of one technological process (perekhod) instead of two or three. Ring-spinning frames with an improved one-apron drafting device and with packages of various sizes are being produced: V-66 R-1, V-76 R-1, and V-83 R-1.

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The testing of five type sizes of 2 LA5 light automatic looms has been completed. It has been established that the loom can operate with from 200 to 230 picks of the sley per minute. The utilization coefficient of working time amounts to 0.92. Productivity is 13 percent greater than that of the Northrop automatic type. The 2 LA5 loom occupies 20 percent less floor space than the ATS-5. Series production of shuttleless looms has been started.

The Scientific Research Institute of Textile and Light Machine Building has played and important role in the development of textile machine building. The institute and its Leningrad affiliate originally served as a central design bureau, after which it became a base for testing and research. In the postwar period, the institute, having obtained a machinery plant for experimentation, produced in 1947 alone a whole series of models of machines of original design, including the cuprammonium and viscose combine "gil'vater"; flyer frames of the following types: centrifugal, tow, and high-speed cotton with suspended flyer; warp-winding automatic; light automatic looms for weaving cloth of high and low counts of cotton yarn and low counts of linen yarns, etc.

Talented designers and inventors have emerged in the textile-machine-building industry. The following were leaders in the designing of better models of Soviet machines: V. I. Vasil'yev, I. S. Zakharov, M. P. Dvornikov, K. G. Prokhorov, and P. S. Malevskiy, in equipping breaking, picking, and preparatory divisions of cotton enterprises; N. M. Dmitriyev, S. A. Paramonov, and V. G. Khodasenvich, in spinning equipment; K. I. Polezhayev, A. I. Makarov, and I. A. Stepanov, in weaving equipment; G. G. Zelenskaya and S. N. Peshekhonov, in dyeing and finishing equipment; V. M. Vasil'yev and A. A. Krasnov, in flax-processing equipment; A. F. Zadoya and A. T. Amelichev, in wool-carding machines; and Ts. M. Blyumberg and I. V. Koptelov, in machines for synthetic fibers.

Inventors and innovators have helped solve a number of important problems in textile machine building. I. D. Zvorykin, innovator in the flax industry, made a valuable contribution in the development of a high-speed spinning frame with a suspended flyer for wet spinning of flax. G. I. Kananin is the originator of the LA-5 light automatic loom. N. I. Asafov suggested a number of innovations for looms, including an improved automatic warp stop motion; V. I. Vasil'yev and V. D. Shaglov invented the high-speed cotton fly frame. V. M. Vasil'yev, A. A. Krasnov, and Abramov developed the high-speed tow centrifugal fly frame. Leont'yev developed a shuttleless loom. N. I. Morozov, Livshits, Gruz, Mogilevskiy and Rogovin invented machines for continuous spinning and finishing of rayon. G. G. Khrushchev and V. M. Sherishev developed an original drafting device for continuous spinning of wool. F. Ye. Zhukov was the first to suggest and introduce mechanization of wool mixing in the cloth industry. A. V. Yershov promoted the idea of the drawing machine with the packing of two slivers in one can.

It can be stated emphatically that the production of equipment for the textile industry in the Soviet Union was mastered, as a whole, for the 30th anniversary of the October Revolution. By then, the USSR had freed itself from the need of importing textile machines.

In 1950, 1,400,000 complete spindle units and 25,000 looms must be produced. In the period of the entire Five-Year Plan, 3,300,000 complete spindle units and 63,000 looms must be produced.

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ACHIEVEMENTS, SHORTCOMINGS IN TEXTILE MACHINE BUILDING

Tekstil'naya Promyshlennost'
Leningrad, Jan 47

Considerable development in Soviet textile machine building was made during the years of the Stalin Five-Year Plans. Large plants were built, which freed the textile industry from dependence on foreign firms. Production of equipment of more than 400 type designations was perfected. Approximately 500,000 complete spindle units were produced per year.

New buildings, namely the largest cotton and linen combines at Tashkent, Barnaul, Leninakan, Stalinabad, Smolensk, Orsha, etc., have been equipped with textile machines of domestic production. A large quantity of mass-produced parts, such as spindles, rings, fluted rollers, etc., for the repair of machines has been put out.

Despite such development, machine builders still were not satisfying the demands of the textile industry for equipment in quantity, number of types, or rate of perfecting new techniques.

The production of equipment for the wool and silk industries and for synthetic fibers was perfected very slowly. The manufacture of machines for the hemp and jute industry and for thread and mechanical fabric (tekhnotkannyy) production, and other special equipment which should be produced in small series, was not set up. New, highly productive types of equipment were developed very slowly, and a number of machines being used were outdated.

Original, highly productive designs of machines were scarcely utilized. For example, a drawing frame suggested by A. V. Yershov in 1935 has still not been produced. Meanwhile, Whitin, a US firm, /Whitin Machine Works, Whitinsville, Massachusetts/ started production of a similar double-silver drawing frame.

In the postwar period, machine builders were confronted with new tasks. First, they had to develop new types of technically improved equipment and increase considerably the capacity of plants. In particular, to conform with the 1946 assignment, the capacity in output of basic technological equipment for the textile industry, should have been brought to 250,000,000,000 /sic/ complete spindle units. This task was not accomplished for a number of basic types of machines. Plants were not restored in planned volume. Series production of many types of equipment was not organized. The 1946 supply plan was not fulfilled.

The 1946 plan for the production of one-process picking machines was fulfilled by only 57 percent; cotton-carding machines, 86 percent; drawing frames, 56 percent; cotton fly frames, 70 percent; spinning frames, 38 percent; looms, 83 percent; and winding frames, 70 percent. The program for the production of cotton twist frames was exceeded by 14 percent.

Particularly unsatisfactory was the fulfillment of the plan for experimental machines. Important types of equipment such as the derby doubler, high-draft drawing frame, large-package spinning frames with single-apron drafting devices (s odnoremeshkovymi vytyazhnymi apparatami), LB-108 dry-spinning frames for flax, a bobbin spinning machine for rayon, and others were not produced.

In 1946, Tekstil'naya promyshlennost' published a series of articles setting forth tasks to be accomplished in the near future, such as perfecting new techniques and giving concrete data on new types of equipment needed by the

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textile industry for improving its work and increasing labor productivity. However, in 1946, a large number of plants have followed the trend of restoring the production of prewar types of machines without effective design changes.

Tashkent Textile-Machine-Building Plant

For instance, the Tashkent Textile-Machine-Building Plant perfected the production of VV-66-UTM ring-spinning frames with a two-apron /drafting/ device. It is time for the plant to shift to the manufacture of machines with a single-apron /drafting/ device and other design improvements needed by the industry. The plant perfected roving frames (peregonnyye bankabroshi) with three-roller drafting apparatus during the postwar Five-Year Plan period when their use was very limited and they were hardly needed. The cotton industry must convert to roving frames with high draft, and the sooner the Tashkent Plant begins their production, the sooner the technical re-equipment of the cotton industry can take place.

Perfection of the very important can roving frames was lagging seriously. A large number of them were planned for installation in 1947 and should have been series produced in the fourth quarter of 1946. However, an experimental model was not released until January 1947.

Penza Machine-Building Plant

The Penza Machine-Building Plant began production of the prewar VV-83 ring-spinning frames which had a two-apron /drafting/ device and a lift of 178 millimeters. Meanwhile, the need is for ring-spinning frames with a single apron /drafting/ device and for larger packages, with a lift of 203 millimeters.

In April 1946, a commission from two ministries accepted the prewar VV-83 ring-spinning frame for series production, pending the perfection of the new type machine. However, in 11 months of 1946, not one VV-83 spinning frame was delivered to textile mills.

In perfecting the production of the prewar LN-4 drawing frame, the Penza Plant carefully remodeled its units in accordance with complaints from textile mills. Malevskiy, chief designer of the drawing frame, and Al tshuler, chief engineer at the plant, improved its design considerably. However, the plant did not completely solve all problems concerning the design of parts which required testing under operating conditions.

In April 1946, the suggestion was made that the drawing frame be set up at the Mill imeni Oktyabr'skaya revolyutsiya and at one of the combing enterprises, for testing and readjustment of the units. The plant has not yet carried out this suggestion; it proceeded to produce the machine with inadequately tested units.

The textile industry has very serious grievances against the Penza Plant in the matter of mastering new techniques. The plant should have manufactured experimental models of derby doublers and drawing frames with high draft in the second quarter of 1946. Even before the war, textile workers needed these machines. In recent years, the machines have received wide dissemination abroad and have been marked for extensive use at home. However, as yet they have not been produced.

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Kuznetsk Textile-Machine-Building Plant

The Kuznetsk Textile-Machine-Building Plant should have perfected series production of all machines of the breaker aggregate, as well as one-process picking machines. The perfection of machines is not going smoothly there, and the production program has not been fulfilled. In 1946, not one complete breaker aggregate was installed at textile mills.

Klimovsk Machine-Building Plant

The picking mechanism in the ATS-5M automatic loom produced at the Klimovsk Machine-Building Plant was not improved in design. As before, the motion of the picker remained nonparallel. The cause of bobbin breakage was not completely eliminated.

A two-contact feeler for bunchless winding is a design change suggested by Engineer Asafov, but it has not yet been approved or accepted by the textile industry.

Continuous temple cutters on earlier ATS-5 looms were unsatisfactory and unreliable in operation. These cutters, without any changes, were incorporated in the new ATS-5M loom.

The thread picker used on the loom was very complex and should have been simplified. The plant did not fulfill this requirement.

The S-2 warp machines produced earlier were not satisfactory. Their electric stops needed improvement. However, improved machines have not yet been made. The 1946 plan for such production was not fulfilled.

Series production of slubbing frames for cord was not started in 1946. The nonfulfillment of the plan for these machines is creating disorganization in cord production.

Shuyskiy Plant imeni Frunze

The Shuyskiy Plant imeni Frunze did not produce a heavy warp machine of engineer Gol'tsev's design or an automatic loom for canvas, as specified by plan.

Plant imeni Karl Marx

The Plant imeni Karl Marx has successfully completed its assignment for the production of first and second-time twisting frames for cord.

The plant pledged to produce an experimental model of twist frame by 1 January 1947 but did not carry out its pledge.

The plant is staffed with qualified personnel, and the perfection of new techniques can be expected of it. However, it has not set up production of Type VLS-108 frames for dry spinning of flax. A flax ring-spinning frame has been developed which could replace the fly frame. The problem is acute, and the production and testing of these spinning frames should have been organized more quickly and extensively. However, the plant spent a great deal of time erecting one machine at a hemp mill in Leningrad where, because of production conditions, it is difficult to obtain an objective evaluation of the new design.

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Presnenskiy Machine-Building Plant

In 1946, the wool industry failed to receive equipment for its plants. This concerns particularly the Presnenskiy Machine-Building Plant, which specialized in carding machines for wool and vicuna wool. Only one triple-combing apparatus was produced for preliminary testing. The approving commission suggested that a number of noted shortcomings be corrected; however, the apparatus was never turned over to the wool industry.

Orel Textile-Machine-Building Plant

In 1946, the Orel Textile-Machine-Building Plant should have perfected the production of many types of machines for the linen industry. However, not all the machines produced were perfect, and the carding machines had a serious defect. Contemporary equipment of this type is equipped with built-in filters for removing dust from the air. The Orel plant's new machines do not have this feature. This deficiency must be corrected in the near future.

A flax fly frame has not yet been produced. Of equipment for preliminary processing of flax fiber, only a very simple cleaning machine and press have been perfected.

Plant imeni Shevchenko

The Plant imeni Shevchenko has an important assignment for the production of new types of cotton-spinning frames. It has developed a valuable design of a single-apron drafting device for spinning frames with an original level weighting (rychazhnaya nagruzka) suggested by engineer Mil'ner.

It is unfortunate, however, that the enterprise was not completely prepared for series production of the machines by the beginning of 1947. Two experimental spinning frames were built from prewar parts or parts received from Penza.

The construction and restoration work has not been completed, and large quantities of machines are lying on the plant grounds. There is also a manpower shortage.

The Ministry of Machine and Instrument Building must give the enterprise a great deal of help to enable it to start series production of the new types of machines in a short time. First, it must create a design bureau with a good experimental shop. The Plant imeni Shevchenko, which enjoyed a good reputation before the war, must be restored quickly.

Vulkan Plant

The Vulkan Plant started work on the production of BK-40 carding machines for the cotton industry. However, an experimental machine was not accepted, and the plant was told to eliminate a number of shortcomings. As yet, the new, improved model has not been presented for approval, and some machines with serious defects have been shipped to mills.

Ivanovo Textile-Machine-Building Plant

Production of sizing machines has not been organized at the Ivanovo Textile-Machine-Building Plant. Meanwhile, only the testing of the prewar ShB-3 machine at the BIM mill has been completed. This machine has considerable advantages over earlier designs; however, it cannot be considered the latest word in technique. The textile industry requires, in a short time, the perfection of production of sizing machines of the newest type, with complete automatization of the sizing process.

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Machine builders did a great deal of work in 1946 collecting technical documents, equipping their plants with metal-cutting equipment, and restoring the production of mass-produced parts for the textile industry. Much has been done in perfecting the production of machines; however, in comparison with assigned tasks, this is still inadequate.

In 1946, considerable progress was made in the field of restoring and organizing production of prewar types of equipment; however, the perfection of new techniques is lagging. In the meantime, new problems are arising. It is necessary to expand the accepted list of experimental machines and to include in the 1947 plan the manufacture of reserve boxes for the distributor of single-process /picking/ machines, a system of combined combing for carding machines, a new design of roving frame on spinning frames with a suspended bobbin (s podvesnoy katushkoy), etc.

A system should be worked out for encouraging and stimulating the creation of new, highly productive types and improved units of equipment and a more rapid mastery of their series production. Such a system must embrace designers and engineers of plants and associates of scientific research institutes working in this field.

At present, it sometimes happens that a plant designer, having developed an improved design of some unit of a machine, does so at the expense of complicating and increasing the cost of manufacturing certain parts. In the long run, the economic effect will be felt not at the plant but at the textile mill. Such an increase in cost in many cases is worthwhile. However, the designer is not adequately stimulated. An effective system must be worked out which encourages the development of new equipment and its speedy perfection.

Not one textile-machine-building plant in capitalist countries operates under such conditions as Soviet plants, where there are unlimited demands and orders for machines.

The Five-Year Plan specifies the production of 1,400,000 complete spindle units and 25,000 looms in 1950. This means that textile machine building must develop at a rate never achieved in any capitalist country.

In the best period of its development, 1900-1915, the capacity of the US textile industry increased by approximately one million spindles a year. The Soviet textile industry will show a considerably larger growth. Machine builders and textile workers must carry out this task together.

Under the projected rate of growth in capacities, the immediate tasks are the perfection of new techniques, improved and speedier methods of developing new and more modern designs, and an increase in output of experimental machines.

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